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TITLE: CALIBRATION METHOD FOR LCD ARRAY TESTER

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INT-CL (IPC): G02F001/13

ABSTRACT:

PROBLEM TO BE SOLVED: To confirm the operation of an LCD array tester and to check inspection accuracy with excellent reproducibility without using a golden sample.

SOLUTION: At the time of the calibration of the LCD array tester provided with a plurality of pixel sensor channels, for which the respective pixel sensor channels are provided with the voltage measuring function of converting an input voltage to a digital valuc and measuring it and the pattern gcnerating function of generating and outputting a prescribed voltage, a reference capacitance for which the various kinds of characteristics are recognized beforehand as an object to be measured and the same one is easily obtained is used and a correction value for correcting dispersion among the pixel sensor

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channels is obtained by using a plurality of measured voltage values obtained by performing the operation of charging the reference capacitor by the voltage generated from the pattern generation function and then measuring the holding voltage of the reference capacitor by the voltage measuring function for the respective pixel sensor channels for two or more times.

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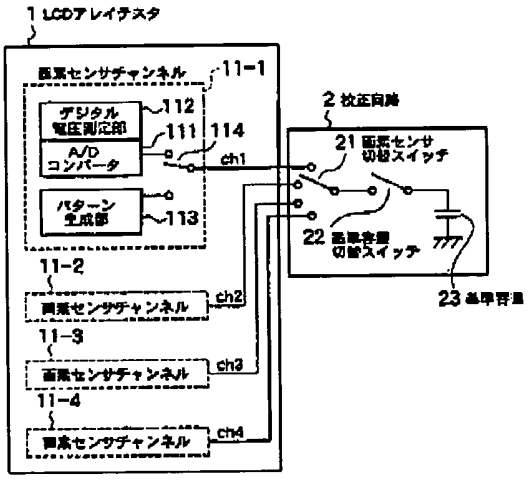
(54)【発明の名称】　ＬＣＤアレイテスタの校正方法

(57)【要約】
【課題】　ゴールデンサンプルを用いることなく、ＬＣＤアレイテスタの動作の確認及び検査精度のチェックを再現性良好に行う。
【解決手段】　複数の画素センサチャンネルを備え、各画素センサチャンネルには入力される電圧をデジタル値に変換して測定する電圧測定機能と、所定の電圧を生成して出力するパターン生成機能とを有するＬＣＤアレイテスタの校正に際して、被測定対象として予め各種特性が分かっていて、且つ同一の物が容易に手に入る基準容量を用い、画素センサチャンネル毎に、前記パターン生成機能から発生された電圧により前記基準容量を充電した後、前記基準容量の保持電圧を前記電圧測定機能で測定する動作を複数回行うことにより得られた複数の測定電圧値を用いて、前記画素センサチャンネル間のバラツキを補正するための補正値を求める。



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【特許請求の範囲】

【請求項１】 複数の画素センサチャンネルを備え、各画素センサチャンネルには入力される電圧をデジタル値に変換して測定する電圧測定機能と、所定の電圧を生成して出力するパターン生成機能とを備えたＬＣＤアレイテスタの校正方法において、

被測定対象として基準容量を用い、画素センサチャンネル毎に、前記パターン生成機能より発生された電圧によって前記基準容量を充電した後、前記基準容量の保持電圧を前記電圧測定機能で測定する動作を複数回行うことにより複数の測定電圧値を得、これら複数の測定電圧値を用いて前記画素センサチャンネル間のバラツキを補正する補正値を求めることを特徴とするＬＣＤアレイテスタの校正方法。

【請求項２】 前記画素センサチャンネル毎に求まった複数の電圧測定値の平均電圧値を求め、得られた各画素センサチャンネルの平均電圧値から全画素センサチャンネルの平均電圧値を求め、この全画素センサチャンネルの平均電圧値と前記各画素センサチャンネルの平均電圧値の差分を各画素センサチャンネルの補正値とすることを特徴とする請求項１に記載のＬＣＤアレイテスタの校正方法。

【請求項３】 前記画素センサチャンネル毎に求まった複数の電圧測定値の平均電圧値を求め、前記基準容量の予め分かっている容量値から一意的に求められる保持電圧値と前記各画素センサチャンネルの平均電圧値の差分を各センサチャンネルの補正値とすることを特徴とする請求項１に記載のＬＣＤアレイテスタの校正方法。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、液晶表示装置（ＬＣＤ）の性能を検査するＬＣＤアレイテスタの品質管理に係り、特にＬＣＤアレイテスタの校正方法に関する。

【０００２】

【従来の技術】従来、ＬＣＤアレイテスタのような検査装置自体の品質を管理するためには、良品としての動作の保証された実デバイス（いわゆるゴールデンサンプル）の測定結果を用いて動作の確認、検査精度のチェックを行っていた。

【０００３】

【発明が解決しようとする課題】しかし、被検査対象であるゴールデンサンプルは経年変化や温度などの環境変化によりその動作が変化する可能性がある。それ故、この方法では、被検査対象の測定再現性がどの程度あるのか疑問であり、その特性についても充分把握ができないため、その分、ＬＣＤアレイテスタの動作の確認及び検査精度のチェックの精度が保証されないという問題があった。その上、ゴールデンサンプルが破損した場合、同じ物を作り出すことは非常に困難であるため、以降、別のゴールデンサンプルを用いてＬＣＤアレイテスタの動作の確認及び検査精度のチェックを行ったとしても、以前のゴールデンサンプルを用いた場合とでは特性の連続性が得られないという問題もあった。

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【０００４】本発明の目的は、ゴールデンサンプルを用いることなく、ＬＣＤアレイテスタの動作の確認及び検査精度のチェックを再現性良好に行うことができるＬＣＤアレイテスタの校正方法を提供することである。

【０００５】

【課題を解決するための手段】上記目的を達成するために、請求項１の発明の特徴は、複数の画素センサチャンネルを備え、各画素センサチャンネルには入力される電圧をデジタル値に変換して測定する電圧測定機能と、所定の電圧を生成して出力するパターン生成機能とを備えたＬＣＤアレイテスタの校正方法において、被測定対象として基準容量を用い、画素センサチャンネル毎に、前記パターン生成機能より発生された電圧によって前記基準容量を充電した後、前記基準容量の保持電圧を前記電圧測定機能で測定する動作を複数回行うことにより複数の測定電圧値を得、これら複数の測定電圧値を用いて前記画素センサチャンネル間のバラツキを補正する補正値を求めることにある。

【０００６】請求項２の発明の特徴は、前記画素センサチャンネル毎に求まった複数の電圧測定値の平均電圧値を求め、得られた各画素センサチャンネルの平均電圧値から全画素センサチャンネルの平均電圧値を求め、この全画素センサチャンネルの平均電圧値と前記各画素センサチャンネルの平均電圧値の差分を各画素センサチャンネルの補正値とすることにある。

【０００７】請求項３の発明の特徴は、前記画素センサチャンネル毎に求まった複数の電圧測定値の平均電圧値を求め、前記基準容量の予め分かっている容量値から一意的に求められる保持電圧値と前記各画素センサチャンネルの平均電圧値の差分を各センサチャンネルの補正値とすることにある。

【０００８】複数の画素センサチャンネルを持つＬＣＤアレイテスタにおいて、標準とするデバイスを使用し、１チャンネルずつ校正を行い、装置の品質を管理する。

【０００９】

【発明の実施の形態】以下、本発明の実施の形態を図面に基づいて説明する。図１は、本発明のＬＣＤアレイテスタの校正方法の一実施形態を説明する説明図である。４個の画素センサチャンネル（以下ｃｈ１～４と記載）を備えたＬＣＤアレイテスタ１に、校正回路２が接続されている。

【００１０】ここで、ＬＣＤアレイテスタ１は複数の画素センサチャンネル（以下、単にチャンネルと称することもある）１１－１～１１－４を有している。そして、各画素センサチャンネルは、Ａ／Ｄコンバータ１１１、デジタル電圧測定部１１２、パターン生成部１１３、並びに、デジタル電圧測定部１１２とパターン生成部１１

3のいずれか一方を入出力端子に接続するスイッチ114を有している（図1では、画素センサチャンネル11-1のみ内部を図示している）。

【0011】校正回路2は、画素センサ切替スイッチ21、基準容量切替スイッチ22及び基準デバイスである基準容量23を有している。ここで、基準容量23としては、予め諸特性が分かっており、且つ同一のものが容易に手に入るものを使用する。

【0012】次に、本実施形態の校正動作について図2、図3のフローチャートを参照して説明する。まず、基準容量23の保持電圧をLCDアレイテスタ1のチャンネルch1のみでm回（30回以上が望ましい）繰り返し測定し、このチャンネルの平均値電圧を（1）式により求める。

【0013】

【数1】

$$ave.Vn = \left(\sum^{m} Vn\right) / m \quad \text{但し、} n = 1 \cdots (1)$$

具体的には（図2参照）、まず、スイッチ21をチャンネルch1へ接続し（ステップ201）、次にスイッチ22をオンし、スイッチ114をパターン生成部113へ接続することによりパターン生成部113で発生された電圧パターンを基準容量23へ印加して、基準容量23を充電する（ステップ202）。一定時間スイッチ22をオフにする間、スイッチ114をA/Dコンバータ111へ接続し、その後スイッチ22を再びオンし、基準容量23の保持電圧VをA/Dコンバータ111に入力する。デジタル電圧測定部112はA/Dコンバータ111によりデジタル値に変換された保持電圧Vを測定する（ステップ203）。この時、読み取った値がV1となる。このような測定をm回行う（ステップ204）。ここで、基準容量23の保持電圧Vを測定することは、この基準容量23の容量を測定することと等価である。

【0014】同様に、チャンネルch2～ch4についても、上記と同様に基準容量23の保持電圧をLCDアレイテスタ1の各チャンネル毎にm回繰り返し測定し、これを全てのチャンネルの測定が終了するまで行う（ステップ205）。

【0015】その後（図3参照）、各チャンネル毎に得られたm個の測定値から各チャンネルの平均値電圧を（1）式により求める（ステップ301）。但し、この場合はn＝2～4である。

【0016】上記のようにして求めた各チャンネル毎の測定結果を、測定電圧とその出現頻度との関係として図4（a）～（d）のように纏めることができる。更に、これら図4に示した各チャンネルの測定結果は図5に示すようにひとつの図にまとめて表示することができる。ここで、図5では長方形の縦方向が測定電圧の分布を示しており、　Vが全チャンネルの平均電圧である。

【0017】この全チャンネルの平均値Vは式（2）で求める（ステップ302）。

【0018】

【数2】

$$ave.V = \left(\sum^{n} ave.Vn\right) / 4 \quad \text{但し、} n = 1 \sim 4 \quad \cdots (2)$$

ここで、全チャンネルの平均値　Vと各チャンネルの平均値　Vnの差を式（3）のように求め、このΔnを補正値とする（ステップ303）。

【0019】

$\Delta n = V - Vn$　但し、$n = 1 \sim 4$　…（3）

（3）式で求めた補正値を各チャンネルの測定値に加算することにより、各チャンネルの平均値が揃い、測定値の片寄りが無くなる。なお、各チャンネルの測定値は式（4）のようになる。

【0020】

$V = Vn - \Delta n$　但し、$n = 1 \sim 4$…（4）

本実施形態によれば、経年変化や使用環境の変化特性が明確に分かっており、同一の物が容易に手に入るコンデンサを基準容量23として、LCDアレイテスタ1の校正に使用しているため、LCDアレイテスタ1のチャンネル間のバラツキの校正を精度が保証された状態で、且つ再現性良好に行うことができる。また、基準容量23が破壊された場合でも、同一性能の物が容易に手に入るため、新しい基準容量23を用いて校正した場合と以前の校正との間に特性の連続性を保持することができる。

【0021】このようにして校正されたLCDアレイテスタ1を用いてLCDの画素の容量を測定した場合、各チャンネル間の測定容量にバラツキがなくなり、例えば輝度に斑のない高品質のLCDの製造に寄与することができる。

【0022】尚、上記実施形態では、全チャンネルの平均値　Vを各チャンネルの補正値を算出する場合の基準とした。この場合は各チャンネルの測定する画素容量は相対値で校正されることになる。しかし、基準容量23の予め分かっている容量値から、上記したパターン生成部113により前記基準容量23を充電した場合に、この基準容量23で保持される電圧V0は一定的に決まるため、この保持電圧V0を補正値算出のための基準としても良い。この場合は、各チャンネルの測定する画素容量は絶対値で校正されることになる。

【0023】

【発明の効果】以上説明したように、本発明のLCDアレイテスタの校正方法によれば、ゴールデンサンプルを用いることなく、LCDアレイテスタの動作の確認及び検査精度のチェックを再現性良好に行うことができる。

【図面の簡単な説明】

【図1】本発明のLCDアレイテスタの校正方法の一実

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施形態を説明する説明図。

【図2】LCDアレイテスタの校正のための基準容量の保持電圧の測定処理手順を示したフローチャート。

【図3】基準容量の保持電圧の測定値から各画素センサチャンネルの補正値を求める手順を示したフローチャート。

【図4】測定電圧とその頻度との関係を画素センサチャンネル毎に示した説明図。

【図5】測定電圧の分布を画素センサチャンネル毎に示した説明図。

【符号の説明】

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1…LCDアレイテスタ

2…校正回路

11-1～11-4…画素センサチャンネル

21…画素センサ切替スイッチ

22…基準容量切替スイッチ

23…基準容量

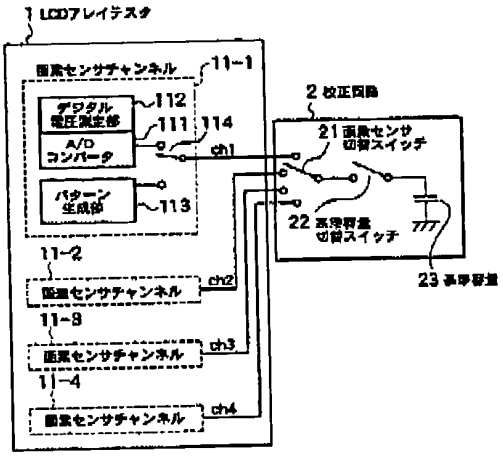
111…A/Dコンバータ

112…デジタル電圧測定部

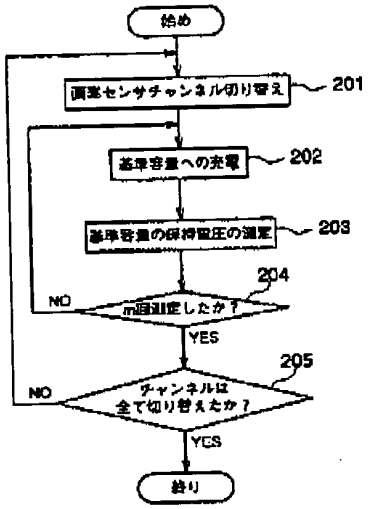
113…パターン生成部

114…スイッチ

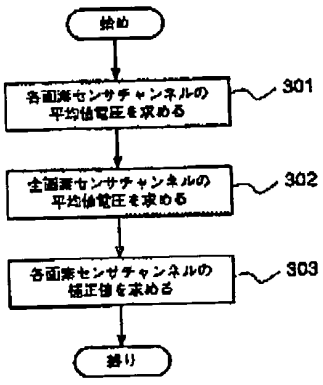
【図1】



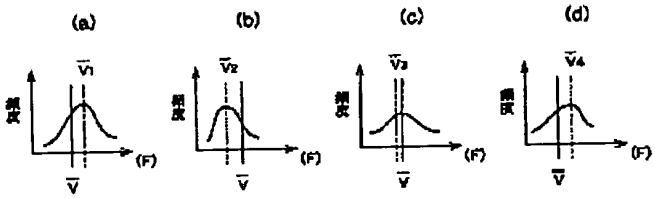
【図2】



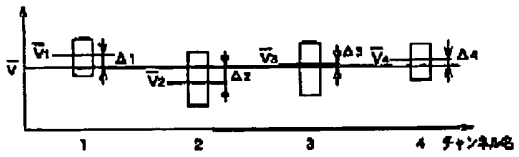
【図3】



【図4】



【図5】



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CLAIMS

[Claim(s)]
[Claim 1] The amplitude-measurement function which changes and measures the electrical potential difference which is equipped with two or more pixel sensor channels, and is inputted into each pixel sensor channel to digital value, In the proofreading approach of the LCD array circuit tester equipped with the pattern generation function which generates and outputs a predetermined electrical potential difference After charging said reference capacity for every pixel sensor channel with the electrical potential difference generated from said pattern generation function, using reference capacity as the measuring object-ed, The proofreading approach of the LCD array circuit tester characterized by calculating the correction value which acquires two or more measurement electrical-potential-difference values, and amends the variation between said pixel sensor channels using the measurement electrical-potential-difference value of these plurality by performing actuation which measures the maintenance electrical potential difference of said reference capacity by said amplitude-measurement function two or more times.
[Claim 2] The proofreading approach of the LCD array circuit tester according to claim 1 characterized by calculating the average electrical-potential-difference value of two or more amplitude-measurement values which were able to be found for said every pixel sensor channel, calculating the average electrical-potential-difference value of all pixel sensor channels from the average electrical-potential-difference value of each obtained pixel sensor channel, and making difference of the average electrical-potential-difference value of all these pixel sensor channels, and the average electrical-potential-difference value of each of said pixel sensor channel into the correction value of each pixel sensor channel.
[Claim 3] The proofreading approach of the LCD array circuit tester according to claim 1 characterized by making into the correction value of each sensor channel difference of the maintenance electrical-potential-difference value which calculates the average electrical-potential-difference value of two or more amplitude-measurement values which were able to be found for said every pixel sensor channel, and is uniquely calculated from the capacity value which said reference capacity understands beforehand, and the average electrical-potential-difference value of each of said pixel sensor channel.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to quality control of the LCD array circuit tester which inspects the engine performance of a liquid crystal display (LCD), especially relates to the proofreading approach of a LCD array circuit tester.
[0002]
[Description of the Prior Art] In order to manage the quality of the test equipment like a LCD array circuit tester itself conventionally, the check of operation and the check of inspection precision were performed using the measurement result of the real device (the so-called golden sample) with which the actuation as an excellent article was guaranteed.
[0003]
[Problem(s) to be Solved by the Invention] However, as for the golden sample which is an inspected object, the actuation may change with environmental variations, such as secular change and temperature. So, by this approach, the measurement reproducibility for inspected was a query about how much it is, and since grasp was impossible enough also about that property, there was a problem that the precision of the check of a check of operation and inspection precision of that part and a LCD array circuit tester was not guaranteed. When a golden sample was moreover damaged, making the same object also had the problem that the continuity of a property was not acquired, by the case where a former golden sample is used, even if it performed the check of actuation of a LCD array circuit tester, and the check of inspection precision after that using another golden sample, since it was very difficult.
[0004] The object of this invention is offering the proofreading approach of the LCD array circuit tester which can perform the check of actuation of a LCD array circuit tester, and the check of inspection precision to repeatability fitness, without using a golden sample.
[0005]
[Means for Solving the Problem] In order to attain the above-mentioned object, the description of invention of claim 1 The amplitude-measurement function which changes and measures the electrical potential difference which is equipped with two or more pixel sensor channels, and is inputted into each pixel sensor channel to digital value, In the proofreading approach of the LCD array circuit tester equipped with the pattern generation function which generates and outputs a predetermined electrical potential difference After charging said reference capacity for every pixel sensor channel with the electrical potential difference generated from said pattern generation function, using reference capacity as the measuring object-ed, By performing actuation which measures the maintenance electrical potential difference of said reference capacity by said amplitude-measurement function two or more times, two or more measurement electrical-potential-difference values are acquired, and it is in calculating the correction value which amends the variation between said pixel sensor channels using the measurement electrical-potential-difference value of these plurality.
[0006] The description of invention of claim 2 calculates the average electrical-potential-difference value of two or more amplitude-measurement values which were able to be found for said every pixel

sensor channel, calculates the average electrical-potential-difference value of all pixel sensor channels from the average electrical-potential-difference value of each obtained pixel sensor channel, and is to make difference of the average electrical-potential-difference value of all these pixel sensor channels, and the average electrical-potential-difference value of each of said pixel sensor channel into the correction value of each pixel sensor channel.

[0007] The description of invention of claim 3 is to make into the correction value of each sensor channel difference of the maintenance electrical-potential-difference value which calculates the average electrical-potential-difference value of two or more amplitude-measurement values which were able to be found for said every pixel sensor channel, and is uniquely calculated from the capacity value which said reference capacity understands beforehand, and the average electrical-potential-difference value of each of said pixel sensor channel.

[0008] In a LCD array circuit tester with two or more pixel sensor channels, the device made into a criterion is used, it proofreads one channel at a time, and the quality of equipment is managed.

[0009]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained based on a drawing. Drawing 1 is an explanatory view explaining 1 operation gestalt of the proofreading approach of the LCD array circuit tester of this invention. The proofreading circuit 2 is connected to the LCD array circuit tester 1 equipped with four pixel sensor channels (the followings 1-ch 4 and publication).

[0010] Here, the LCD array circuit tester 1 has two or more pixel sensor channels (a channel may only be called hereafter) 11-1 to 11-4. And each pixel sensor channel has the switch 114 which connects the digital amplitude-measurement section 112 or the pattern generation section 113 to A/D converter 111, the digital amplitude-measurement section 112, the pattern generation section 113, and a list at an input/output terminal (in drawing 1 , only the pixel sensor channel 11-1 is illustrating the interior).

[0011] The proofreading circuit 2 has the reference capacity 23 which is the pixel sensor circuit changing switch 21, the reference capacity circuit changing switch 22, and a criteria device. Here, that by which many properties are known beforehand and the same thing is easily obtained as reference capacity 23 is used.

[0012] Next, proofreading actuation of this operation gestalt is explained with reference to the flow chart of drawing 2 and drawing 3 . First, only by the channel ch1 of the LCD array circuit tester 1, the maintenance electrical potential difference of reference capacity 23 is repeated m times (30 times or more are desirable), and is measured, and it asks for the average electrical potential difference of this channel by (1) type.

[0013]

[Equation 1]

$$\text{ave. } Vn = \left(\sum^{m} Vn\right) / m \quad \text{但し、} n = 1 \cdots \quad (1)$$

Specifically (refer to drawing 2) a switch 21 is connected to a channel ch1 (step 201), then a switch 22 is turned on first, the electrical-potential-difference pattern generated in the pattern generation section 113 by making pattern generation section 113 HE connection of the switch 114 is impressed to reference capacity 23, and reference capacity 23 is charged (step 202). While turning OFF the fixed time switch 22, a switch 114 is connected to A/D converter 111, a switch 22 is turned on again after that, and the maintenance electrical potential difference V of reference capacity 23 is inputted into A/D converter 111. The digital amplitude-measurement section 112 measures the maintenance electrical potential difference V changed into digital value by A/D converter 111 (step 203). The read value is set to V1 at this time. Such measurement is performed m times (step 204). Here, it is equivalent to measuring the capacity of this reference capacity 23 to measure the maintenance electrical potential difference V of reference capacity 23.

[0014] Similarly, about the channels ch2-ch4 as well as the above, for every channel of the LCD array circuit tester 1, the maintenance electrical potential difference of reference capacity 23 is repeated m times, and is measured, and it carries out until measurement of all channels ends this (step 205).

[0015] After that, (refer to drawing 3), the average electrical potential difference of each channel is

calculated by (1) type from the measured value of m pieces obtained for every channel (step 301). However, it is n=2-4 in this case.
[0016] The measurement result for every channel for which it asked as mentioned above can be summarized like drawing 4 (a) - (d) as relation between a measurement electrical potential difference and its frequency of occurrence. Furthermore, the measurement result of each channel shown in these drawing 4 can be collectively displayed on one drawing, as shown in drawing 5 . Here, by drawing 5 , the rectangular lengthwise direction shows distribution of a measurement electrical potential difference. V is the average electrical potential difference of all channels.
[0017] The average V of all these channels is calculated by the formula (2) (step 302).
[0018]
[Equation 2]

$$\text{ave. } V = \left(\sum_{n} \text{ave. } Vn\right) / 4 \quad \text{但し、} n = 1 \sim 4 \quad \cdots (2)$$

Here, it is the average value of all channels. Average value of V and each channel The difference of Vn is searched for like a formula (3), and let this deltan be correction value (step 303).
[0019]
deltan=V-Vn However, n=1-4 -- (3)
(3) adding the correction value calculated by the formula to the measured value of each channel -- the average of each channel -- the deviation of a set and measured value -- nothing -- < -- it becomes. In addition, the measured value of each channel becomes like a formula (4).
[0020]
V= Vn-deltan However, n=1-4 -- (4)
according to this operation gestalt , the change property of secular change or an operating environment be know clearly , and since the same object be use it for proofreading of the LCD array circuit tester 1 by make into reference capacity 23 the capacitor obtain easily , it be in the condition that proofreading of the variation between the channels of the LCD array circuit tester 1 be guaranteed to precision , and can carry out to repeatability fitness . Moreover, since the object of identity ability is easily obtained even when reference capacity 23 is destroyed, the continuity of a property can be held between the case where it proofreads using the new reference capacity 23, and former proofreading.
[0021] Thus, when the capacity of the pixel of LCD is measured using the proofread LCD array circuit tester 1, it can contribute to manufacture of LCD of the high quality which the variation of is lost in the measurement capacity between each channel, for example, does not have spots in brightness.
[0022] In addition, at the above-mentioned operation gestalt, it is the average value of all channels. V was made into the criteria in the case of computing the correction value of each channel. In this case, the pixel capacity which each channel measures will be proofread by the relative value. However, when said reference capacity 23 is charged by the above-mentioned pattern generation section 113 from the capacity value which reference capacity 23 understands beforehand, since the electrical potential difference V0 held with this reference capacity 23 is decided uniquely, it is good also as criteria for correction value calculation of this maintenance electrical potential difference V0. In this case, the pixel capacity which each channel measures will be proofread in an absolute value.
[0023]
[Effect of the Invention] The check of actuation of a LCD array circuit tester and the check of inspection precision can be performed to repeatability fitness, without using a golden sample according to the proofreading approach of the LCD array circuit tester of this invention, as explained above.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention relates to quality control of the LCD array circuit tester which inspects the engine performance of a liquid crystal display (LCD), especially relates to the proofreading approach of a LCD array circuit tester.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] In order to manage the quality of the test equipment like a LCD array circuit tester itself conventionally, the check of operation and the check of inspection precision were performed using the measurement result of the real device (the so-called golden sample) with which the actuation as an excellent article was guaranteed.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] The check of actuation of a LCD array circuit tester and the check of inspection precision can be performed to repeatability fitness, without using a golden sample according to the proofreading approach of the LCD array circuit tester of this invention, as explained above.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, as for the golden sample which is an inspected object, the actuation may change with environmental variations, such as secular change and temperature. So, by this approach, the measurement reproducibility for inspected was a query about how much it is, and since grasp was impossible enough also about that property, there was a problem that the precision of the check of a check of operation and inspection precision of that part and a LCD array circuit tester was not guaranteed. When a golden sample was morcover damaged, making the same object also had the problem that the continuity of a property was not acquired, by the case where a former golden sample is used, even if it performed the check of actuation of a LCD array circuit tester, and the check of inspection precision after that using another golden sample, since it was very difficult.
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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned object, the description of invention of claim 1 The amplitude-measurement function which changes and measures the electrical potential difference which is equipped with two or more pixel sensor channels, and is inputted into each pixel sensor channel to digital value, In the proofreading approach of the LCD array circuit tester equipped with the pattern generation function which generates and outputs a predetermined electrical potential difference After charging said reference capacity for every pixel sensor channel with the electrical potential difference generated from said pattern generation function, using reference capacity as the measuring object-cd, By performing actuation which measures the maintenance electrical potential difference of said reference capacity by said amplitude-measurement function two or more times, two or more measurement electrical-potential-difference values are acquired, and it is in calculating the correction value which amends the variation between said pixel sensor channels using the measurement electrical-potential-difference value of these plurality.
[0006] The description of invention of claim 2 calculates the average electrical-potential-difference value of two or more amplitude-measurement values which were able to be found for said every pixel sensor channel, calculates the average electrical-potential-difference value of all pixel sensor channels from the average electrical-potential-difference value of each obtained pixel sensor channel, and is to make difference of the average electrical-potential-difference value of all these pixel sensor channels, and the average electrical-potential-difference value of each of said pixel sensor channel into the correction value of each pixel sensor channel.
[0007] The description of invention of claim 3 is to make into the correction value of each sensor channel difference of the maintenance electrical-potential-difference value which calculates the average electrical-potential-difference value of two or more amplitude-measurement values which were able to be found for said every pixel sensor channel, and is uniquely calculated from the capacity value which said reference capacity understands beforehand, and the average electrical-potential-difference value of each of said pixel sensor channel.
[0008] In a LCD array circuit tester with two or more pixel sensor channels, the device made into a criterion is used, it proofreads one channel at a time, and the quality of equipment is managed.
[0009]
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[Equation 1]

$$ave.Vn = (\sum^{m} Vn) / m \quad \text{但し、} n = 1 \cdots (1)$$

Specifically (refer to drawing 2) a switch 21 is connected to a channel ch1 (step 201), then a switch 22 is turned on first, the electrical-potential-difference pattern generated in the pattern generation section 113 by making pattern generation section 113 HE connection of the switch 114 is impressed to reference capacity 23, and reference capacity 23 is charged (step 202). While turning OFF the fixed time switch 22, a switch 114 is connected to A/D converter 111, a switch 22 is turned on again after that, and the maintenance electrical potential difference V of reference capacity 23 is inputted into A/D converter 111. The digital amplitude-measurement section 112 measures the maintenance electrical potential difference V changed into digital value by A/D converter 111 (step 203). The read value is set to V1 at this time. Such measurement is performed m times (step 204). Here, it is equivalent to measuring the capacity of this reference capacity 23 to measure the maintenance electrical potential difference V of reference capacity 23.

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[0017] The average V of all these channels is calculated by the formula (2) (step 302).

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[0020]

V= Vn-deltan However, n=1-4 -- (4)

according to this operation gestalt , the change property of secular change or an operating environment be know clearly , and since the same object be use it for proofreading of the LCD array circuit tester 1

by make into reference capacity 23 the capacitor obtain easily , it be in the condition that proofreading of the variation between the channels of the LCD array circuit tester 1 be guaranteed to precision , and can carry out to repeatability fitness . Moreover, since the object of identity ability is easily obtained even when reference capacity 23 is destroyed, the continuity of a property can be held between the case where it proofreads using the new reference capacity 23, and former proofreading.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The explanatory view explaining 1 operation gestalt of the proofreading approach of the LCD array circuit tester of this invention.
[Drawing 2] The flow chart which showed the measurement procedure of the maintenance electrical potential difference of the reference capacity for proofreading of a LCD array circuit tester.
[Drawing 3] The flow chart which showed the procedure of calculating the correction value of each pixel sensor channel from the measured value of the maintenance electrical potential difference of reference capacity.
[Drawing 4] The explanatory view having shown the relation between a measurement electrical potential difference and its frequency for every pixel sensor channel.
[Drawing 5] The explanatory view having shown distribution of a measurement electrical potential difference for every pixel sensor channel.
[Description of Notations]
1 -- LCD array circuit tester
2 -- Proofreading circuit
11-1 to 11-4 -- Pixel sensor channel
21 -- Pixel sensor circuit changing switch
22 -- Reference capacity circuit changing switch
23 -- Reference capacity
111 -- A/D converter
112 -- Digital amplitude-measurement section
113 -- Pattern generation section
114 -- Switch

[Translation done.]

PAGE 95/97 * RCVD AT 2/2/2005 5:34:04 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/1 * DNIS:8729306 * CSID:7145573347 * DURATION (mm-ss):29-10

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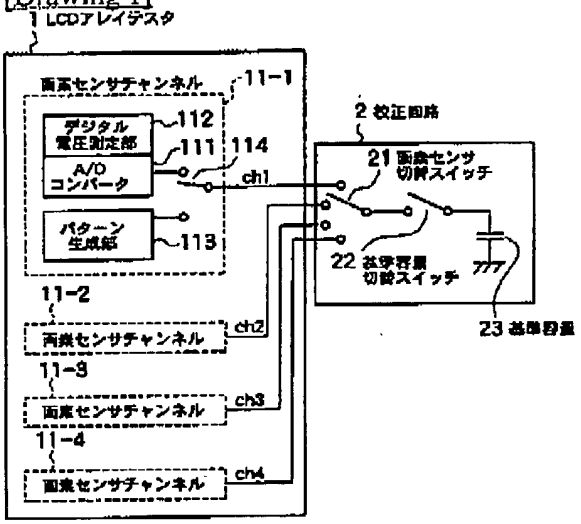
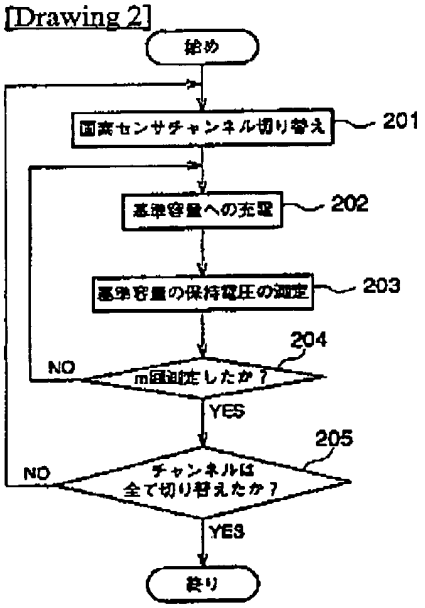
DRAWINGS

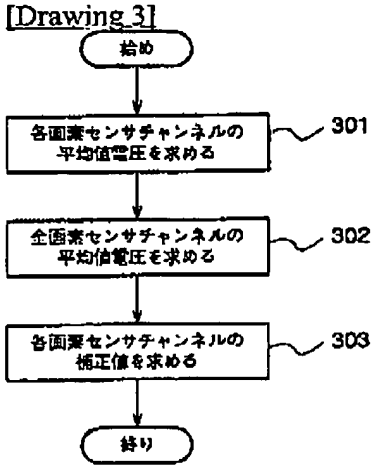
[Drawing 1]



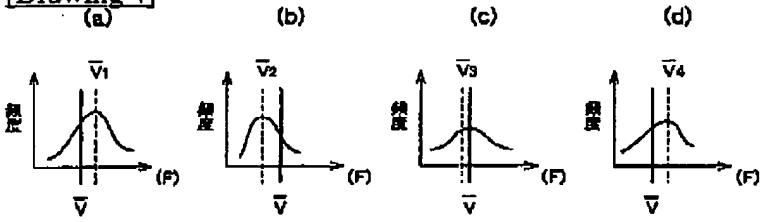
[Drawing 2]



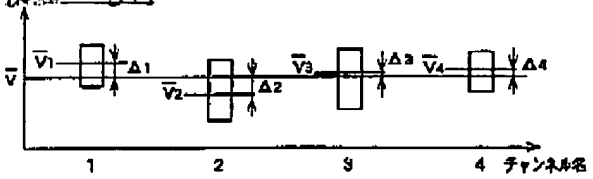
[Drawing 3]



[Drawing 4]



[Drawing 5]



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